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EFFECT OF AGE AND DEVELOPMENT ON BUTTERFAT PRODUCTION OF REGISTER-OF-MERIT JERSEY AND ADVANCED-REGISTER GUERNSEY CATTLE

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NEED FOR MORE INFORMATION

Age and development have a marked influence on the production of milk by dairy cows. This fact is acknowledged by the various record associations, and the requirements for recognition of cows as high producers are adjusted according to the age at which they are tested. The register of production is known in the Jersey breed as the Register of Merit, and in the Guernsey breed as the Advanced Register.

The student of the heredity of productive ability in dairy cattle who draws his material from the advanced-register and register-of-merit records is confronted with the problem of establishing some basis for comparing records made by cows of different ages, so as to avoid discrimination against the animal with a record made at an immature age. With the vast amount of official testing of dairy cattle that has been done there has accumulated a large fund of information which is useful and desirable for studies of this character. Cows and heifers are tested at various ages. Many animals tested as heifers are not retested after reaching maturity; consequently, without some method of adjusting records made at varying ages to a comparable basis, the use of this material is greatly restricted.

The value of a bull is largely based upon his ability to sire heifers of uniformly high production. In order to determine the transmitting ability of a sire, it is necessary to compare the records of his daughters with those of their dams. To limit the comparison only to those sets of dams and daughters with records at the same age would leave too few for positive conclusions, and to compare records of animals of different ages we must use some means of adjusting those of immature animals.

It is also a matter of interest to every breeder to know what relationship exists between the record of a 2-year animal and that of the same animal at 5 years of age, in order to be able to form some fairly accurate estimate of the ultimate ability of his heifers.

MATERIAL USED FOR THIS STUDY

The sources of material for this study are the published results of official tests of Jersey and Guernsey cattle. The study embraces all class A and class AA records up to and including the 1921 volume of the Register of Merit of Jersey Cattle; and all single-letter advanced-register records up to and including Volume 34, No. 6 (April, 1922) of the Herd Register of the American Guernsey Cattle Club. A total of 14,571 Jersey records and 8,602 Guernsey records are used in the study of the effect of age on the production of butterfat.

These sources offer an abundance of authentic material for studies of this character. The records are made under careful supervision of the State experiment stations. The objections to using them are (1) that they are made by a selected group of individual animals, as the requirements for entry into the Advanced Register and Register of Merit exclude certain animals which fail to meet their requirements; (2) that cows on official test are usually those which the breeder thinks in advance will qualify; (3) and that before and during the test they receive better care and feed than ordinary herd cows.

It should be remembered, however, that a table of relationship of records of different ages evolved from this material would be used almost solely in connection with official records, because most studies of inheritance and prepotency of sires are based on records made under advanced-register conditions.

Though official records represent a selected group of animals, these animals were tested on hundreds of farms scattered across the country from coast to coast and from the Canadian line to the Gulf of Mexico. All conditions of climate are encountered in such a wide territory, systems of herd management range from everyday farm care to highly specialized treatment, and a great variety of feeds are used. The environmental effect of any particular locality or system of handling test cows is neutralized when all records are blended in an average drawn from so many animals scattered over a wide area.

INCREASE IN PRODUCTION WITH AGE

The objects of this study were to determine (1) the increase in production that came with increasing age; (2) whether this increase in production with age was the same for younger as for older animals; and (3) at what age the maximum production was reached.

It was first planned to use only the records of animals that had two or more records, but the factor of development was found to enter into the second record in addition to the factor of increasing age, hence to determine the influence of age a study was made of initial records only. It may be assumed, therefore, that the difference between the average records for the various age groups shown in the tables is due to the influence of age only.

Tables 1 and 2 show what proportion the average production at any age is of the average mature production.

TABLE 1.—*Initial records at various ages of single-letter advanced-register Guernsey cows*

Age (years)	Number of records	Average production of butterfat	Percentage that production at this age is of average mature production	Age (years)	Number of records	Average production of butterfat	Percentage that production at this age is of average mature production
		Pounds	*Per cent*			*Pounds*	*Per cent*
Under 2	275	368	74.8	9 to 9½	102	502	102.0
2 to 2½	2,367	404	82.1	9½ to 10	80	496	100.8
2½ to 3	1,211	424	86.2	10 to 10½	45	493	100.2
3 to 3½	897	433	88.0	10½ to 11	27	486	98.8
3½ to 4	695	453	92.1	11 to 11½	28	459	93.3
4 to 4½	625	470	95.5	11½ to 12	15	456	92.7
4½ to 5	432	473	96.1	12 to 12½	13	504	102.4
5 to 5½	373	495	100.6	12½ to 13	8	475	96.5
5½ to 6	313	489	99.4	13 to 13½	10	454	92.3
6 to 6½	305	482	98.0	13½ to 14	8	494	100.4
6½ to 7	214	487	99.0	14 to 14½	3	417	84.8
7 to 7½	179	495	100.6	15 to 15½	3	456	92.7
7½ to 8	148	499	101.4	16½ to 17	1	395	80.3
8 to 8½	135	496	100.8	17 to 17½	1	458	93.1
8½ to-9	88	495	100.6	17½ to 18	1	364	74.0

TABLE 2.—*Initial records at various ages of class A and class AA register-of-merit Jersey cows*

Age (years)	Number of records	Average production of butterfat	Percentage that production at this age is of average mature production	Age (years)	Number of records	Average production of butterfat	Percentage that production at this age is of average mature production
		Pounds	*Per cent*			*Pounds*	*Per cent*
Under 2	1,237	343	72.7	9½ to 10	128	475	100.6
2 to 2½	3,633	368	78.0	10 to 10½	114	476	100.8
2½ to 3	1,313	386	81.8	10½ to 11	68	459	97.2
3 to 3½	1,298	404	85.6	11 to 11½	53	454	96.2
3½ to 4	1,011	423	89.8	11½ to 12	39	478	101.3
4 to 4½	924	440	93.2	12 to 12½	40	445	94.3
4½ to 5	705	454	96.2	12½ to 13	16	436	92.4
5 to 5½	673	457	96.8	13 to 13½	18	445	94.3
5½ to 6	587	469	99.4	13½ to 14	11	475	100.6
6 to 6½	509	475	100.6	14 to 14½	6	439	93.0
6½ to 7	404	471	99.8	14½ to 15	6	424	89.8
7 to 7½	395	468	99.2	15 to 15½	2	412	87.3
7½ to 8	310	470	99.6	15½ to 16	4	405	85.8
8 to 8½	267	480	101.7	16 to 16½	2	437	92.6
8½ to 9	232	462	97.9	16½ to 17	2	391	82.8
9 to 9½	163	468	99.2	18 to 18½	1	401	85.0

The data studied do not show that there is a definite age at which all cows reach their maximum producing ability. For both Guernsey and Jersey cattle there is a period of years during which the average production of animals in the various age groups shows only slight variation. These fluctuations have no decided trend, and this entire period is included in the age of maximum production. The Jersey cows seem to reach maturity at 6 years of age, and there is no decided decline in average production until after the age of 10½ years. There are 2,522 initial records in this period, according to Table 2, and the average is 472 pounds of butterfat. The Guernsey cows seem to reach mature producing ability at 5 years of age, and there is no marked decline in the average production until the age of 11 years. As shown in Table 1, this 6-year period includes 2,009 initial records averaging 492 pounds of butterfat. The percentages shown in Tables 1 and 2 are based on these amounts as average mature production.

Unless this age of mature or maximum producing capacity is spread over a period of years it is difficult to account for the performances of those cows which have completed two or more records of approximately equal quantities of butterfat during mature life.

The distribution of the initial records for the two breeds studied is shown in Tables 3 and 4. It is true, however, that the requirements for entry of cows in the Register of Merit and Advanced Register exert a selective influence on the distribution of records by excluding animals which produce less than the required quantity of butterfat; and in addition there is some selection by breeders because of the practice of testing only certain animals in their herds.

The distribution is not symmetrical; 56.4 per cent of all the Guernsey records and 58 per cent of all the Jersey records fall below the averages of their respective groups.

On statistical analysis the 14,571 Jersey records show a mean of 411.41 ± 0.51 pounds of butterfat, with a standard deviation of 90.68 ± 0.36 pounds of fat, and a coefficient of variability of 22.04 ± 0.09.

The mean of the 8,602 Guernsey records was found to be 442.07 ± 0.69 pounds of butterfat, standard deviation 94.54 ± 0.49 pounds of butterfat, and coefficient of variability 21.39 ± 0.11.

TABLE 3.—*Distribution of initial records of single-letter advanced-register Guernsey cows according to age*

Pounds of butterfat	Age										Total
	Under 2 years	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 years and older	
250 to 274	19	60									79
275 to 299	29	187	7								223
300 to 324	44	325	85	1							455
325 to 349	35	383	142	34							594
350 to 374	31	436	170	95	34	30	13	13	9	14	845
375 to 399	31	415	193	122	65	55	23	26	14	19	963
400 to 424	30	390	179	114	77	60	29	16	20	19	934
425 to 449	16	336	145	112	72	66	46	30	23	21	867
450 to 474	17	271	165	129	76	65	34	20	26	21	824
475 to 499	10	210	120	106	85	61	36	19	16	6	669
500 to 524	7	181	93	88	62	42	36	25	16	16	566
525 to 549	3	135	105	62	43	28	35	13	13	14	451
550 to 574	1	91	62	61	49	29	22	17	6	14	352
575 to 599	2	52	44	39	35	28	17	15	12	5	249
600 to 624		40	28	31	30	19	11	10	4	6	179
625 to 649		24	25	23	25	12	8	4	8	3	132
650 to 674		17	10	8	7	6	4	4	6		62
675 to 699		6	8	9	11	4	5	4	2	3	52
700 to 724		8	4	5	10	9	3	3		1	43
725 to 749		7	3	5	2	1	1	2	1		22
750 to 774		2	2	5	2				1	1	13
775 to 799		1	1	4		1	2	1	2		12
800 to 824		1		3		1	2				7
825 to 849				1	1	1					3
850 to 874			1						2		3
875 to 899								1	1		2
900 to 924											
925 to 949						1					1
Total	275	3, 578	1, 592	1, 057	686	519	327	223	182	163	8, 602

TABLE 4.—*Distribution of initial records of class A and class AA Jersey cows, according to age*

Pounds of butterfat	Age										Total
	Under 2 years	2 years	3 years	4 years	5 years	6 years	7 years	8 years	9 years	10 years and older	
250 to 274	172	231									403
275 to 299	183	611	29								823
300 to 324	226	744	211	1							1, 182
325 to 349	172	726	327	94							1, 319
350 to 374	162	734	344	213	129	78	54	31	19	53	1, 817
375 to 399	119	618	340	233	173	129	101	62	41	49	1, 865
400 to 424	67	454	311	215	187	136	117	80	48	59	1, 674
425 to 449	53	328	224	198	176	111	97	62	44	49	1, 342
450 to 474	31	244	192	185	146	84	66	61	33	38	1, 080
475 to 499	12	173	114	139	121	76	64	56	23	42	820
500 to 524	15	125	97	109	84	78	57	37	15	26	643
525 to 549	9	90	63	64	67	46	32	35	22	14	442
550 to 574	6	53	41	63	45	48	29	23	9	10	327
575 to 599	4	43	33	36	40	33	24	12	9	11	245
600 to 624	1	26	25	32	32	31	21	7	9	5	189
625 to 649	2	15	20	17	16	20	8	13	5	11	127
650 to 674	1	13	16	9	12	11	9	7	2	5	85
675 to 699		9	8	4	10	8	5	1	3	2	50
700 to 724		4	5	9	10	10	9	5	4	4	60
725 to 749		1	4	3	3	5	3	3	2	1	25
750 to 774		3	3	2	5	1	1	1			16
775 to 799					1	5	3	1		1	11
800 to 824	1	1		1	2	1	4		2		12
825 to 849	1		1	2		1		2			7
850 to 874							1			1	2
875 to 899											
900 to 924										1	1
925 to 949						1					1
950 to 974					1				1		2
975 to 999			1								1
Total	1, 237	5, 246	2, 409	1, 629	1, 260	913	705	499	291	382	14, 571

THE FACTOR OF DEVELOPMENT

In studying the official-test records of animals grouped according to age it is apparent that in advancing from class to class there is some influence at work, other than age, which causes an increase in production. A comparison of the tables of initial records with those made up of both initial and reentry records brings this point out clearly. It is also brought to our attention in comparing records made at advanced ages by the same individuals, after age itself has ceased to bring about a further increase in production. With very few exceptions cows which made their initial records after reaching maturity have increased these records when tested again.

The first grouping of animals to study the influence of age on production was made only from animals having two or more records. It was found that because of the influence on the second record of the development made by the animal during the initial test, these retest records did not offer a correct indication of the effect on production of advance in age; but, when compared with the average initial records made for each age class, these retest records do show the apparent influence on later records of the development made by the animal during the first test.

Tables 5 to 21, inclusive, show the average initial and retest records of all Guernsey and Jersey cows having two records. A study of these tables will show the manner in which the animals are grouped. In Table 5, for instance, all the cows made their initial records under

2 years of age, and two cows in this class, constituting the first group, whose initial records average 295 pounds of butterfat, were retested when 2½ to 3 years old and made retest records averaging 393 pounds of butterfat. Fourteen cows with initial records averaging 396 pounds of butterfat were retested when 3 to 3½ years old and made retest records averaging 511 pounds of butterfat.

The difference between the average reentry and average initial records is divided into two parts, one of which represents the increment due to age and the other the portion of increase due to the development brought about by reason of the initial record.

The column which succeeds the series of reentry record columns shows the portion of the reentry record which is due to the increase in age since the initial record was made. The next double column in the table shows the portion of the reentry record which is due to development. This is given in pounds of butterfat and percentage of the reentry record. The last column shows the average per cent of increase due to development for the entire group.

To complete the illustration given above, the average reentry record of the two cows in the first group was 98 pounds greater than their initial record; 45 pounds of this increase was due to the year's increase in age, and 53 pounds, or 13.5 per cent, was due to the development the heifers underwent because of the feeding and handling during the previous test.

The first group in Table 13 includes 51 heifers with average initial records, made under 2 years of age, of 340 pounds of butterfat. These same 51 heifers made reentry records at 2½ to 3 years of age which average 412 pounds of butterfat. The total increase is 72 pounds of butterfat, of which 43 pounds is due to the year's increase in age, and 28 pounds, or 7 per cent, is due to development.

A word of explanation should be given as to how these results are obtained. The 51 Jerseys under 2 years of age in the first group of Table 13 average 340 pounds of butterfat on their initial tests. The average initial record of 1,237 Jerseys as shown in Table 2 is 343 pounds of butterfat. Therefore this group of 51 produced 99.1 per cent of the average of all animals under 2 years. The average production of 1,613 Jerseys at the age of 2½ to 3 years is 386 pounds of butterfat (Table 2), and 99.1 per cent of 386 is 383 pounds of butterfat, which should be the estimated production of this group when 2½ to 3 years old, allowing for the normal increase due to age. The difference between 412 pounds, the actual reentry record, and 383 pounds, the estimated production for this group at 2½ to 3 years of age, is 28 pounds, and this may be said to represent that portion of the increase which is due to development.

In this study there are 209 groups of Jerseys, and all but 23 of the groups show a positive development factor. There are 3,722 individuals in these 209 groups, and the 23 negative groups number only 39 individuals. These negative results are frequently based on groups numbering only one individual.

The Guernseys with two records number 1,215, listed in 148 groups. Only 14 individuals in 9 groups fail to show a positive development factor.

In a total of 3,722 pairs of Jersey records studied, the development factor averages 11.0 per cent of the reentry record; and in 1,215 pairs of Guernsey records an average of 12.2 per cent of the reentry record is due to development.

Where the groups are sufficiently large to be significant, this factor of development is fairly uniform. Groups containing small numbers of individuals show the greatest fluctuations, which is to be expected. The tables do seem to indicate, however, that where the interval is very long between the initial and reentry records the development is more marked. This may be contrary to what would be expected, or it is possible that during the lapse of a considerable period of time there has been sufficiently marked improvement in methods of handling test cows to account for this greater development.

There is sufficient evidence to prove that official testing develops the productive ability of dairy cows, and that the feeding and care, combined with the prolonged milking period during which the cow is encouraged to yield her utmost, have an appreciable and positive effect on her production during subsequent lactation periods.

TABLE 5.—*Comparison of average initial and retest records of Guernseys having initial records made at age under 2 years (single-letter records)*

Number of cows	Average initial butterfat record made under 2 years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)																Increase due to age	Portion of reentry record due to development		Average due to development for this group
		2½ to 3	3 to 3½	3½ to 4	4 to 4½	4½ to 5	5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½				
	Pounds																	*Pounds*	*Pounds*	*P. ct.*	*P. ct.*
2	295	393	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	45	53	13.5	8.11
14	396	--	511	---	---	---	---	---	---	---	---	---	---	---	---	---	---	70	45	8.8	
4	358	---	---	463	---	---	---	---	---	---	---	---	---	---	---	---	---	83	22	4.8	
4	371	---	---	---	538	---	---	---	---	---	---	---	---	---	---	---	---	103	64	11.9	
6	388	---	---	---	---	578	---	---	---	---	---	---	---	---	---	---	---	111	79	13.7	
1	584	---	---	---	---	---	695	---	---	---	---	---	---	---	---	---	---	197	−86	−12.4	
7	383	---	---	---	---	---	---	559	---	---	---	---	---	---	---	---	---	129	47	8.4	
2	321	---	---	---	---	---	---	---	467	---	---	---	---	---	---	---	---	108	38	8.1	
4	407	---	---	---	---	---	---	---	---	571	---	---	---	---	---	---	---	137	27	4.7	
5	392	---	---	---	---	---	---	---	---	---	486	---	---	---	---	---	---	132	−38	−7.8	
1	321	---	---	---	---	---	---	---	---	---	---	533	---	---	---	---	---	108	104	19.5	
2	415	---	---	---	---	---	---	---	---	---	---	---	603	---	---	---	---	140	48	8.0	
2	311	---	---	---	---	---	---	---	---	---	---	---	---	643	---	---	---	105	227	35.3	
1	321	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	422	108	−7	−1.7	

TABLE 6.—*Comparison of average initial and retest records of Guernseys having initial records made at age of 2 years (single-letter records)*

Number of cows	Average initial butterfat record made at 2 to 2½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)															Increase due to age	Portion of reentry record due to development		Average due to development for this group
		3 to 3½	3½ to 4	4 to 4½	4½ to 5	5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½				
	Pounds																*Pounds*	*Pounds*	*P. ct.*	*P. ct.*
46	424	501															31	46	9.2	10.7
106	449		546														54	43	7.9	
50	427			541													70	44	8.1	
70	435				552												74	43	7.8	
36	418					596											91	87	14.6	
34	416						574										91	67	11.7	
34	430							600									93	77	12.8	
22	381								574								83	110	19.2	
18	406									587							88	93	15.8	
11	443										620						97	80	12.9	
6	401											576					88	87	15.1	
10	402												595				88	105	17.6	
2	390													637			85	162	25.4	
2	333														565		72	160	28.3	
2	390															541	85	66	12.2	
	Made at 2½ to 3 years old																			
43	448		529														31	50	9.5	10.6
47	447			544													48	49	9.0	
27	434				547												50	63	11.5	
23	455					558											73	30	5.4	
19	447						605										72	86	14.2	
17	423							573									68	82	14.3	
16	409								535								66	60	11.2	
8	409									579							66	104	18.0	
4	423										579						68	88	15.2	
6	489											578					78	11	1.9	
2	359													621			58	204	32.9	
2	496														647		80	71	11.0	
1	333															519	53	133	25.6	

TABLE 7.—*Comparison of average initial and retest records of Guernseys having initial records made at age of 3 years (single-letter records)*

Number of cows	Average initial butterfat record made at 3 to 3½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)															Increase due to age	Portion of reentry record due to development		Average due to development for this group
		4 to 4½	4½ to 5	5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½				
	Pounds																*Pounds*	*Pounds*	*P. ct.*	*Per cent*
20	421	550															36	93	16.9	13.2
30	442		567														41	84	14.8	
18	422			574													58	94	16.4	
24	459				565												63	43	7.6	
14	462					572											63	47	8.2	
13	442						563										60	61	10.8	
12	433							590									59	98	16.6	
4	357								474								48	69	14.6	
3	592									692							81	19	2.7	
3	421										637						57	159	25.0	
2	486											625					66	73	11.7	
1	405													774			55	314	40.6	
1	555														545		76	−86	−15.8	
1	517															673	42	114	16.9	
	Made at 3½ to 4 years old																			
17	479		556														21	56	10.0	14.6
19	443			546													38	65	11.9	
10	439				537												38	60	11.2	
15	496					634											43	95	15.0	
8	504						601										44	53	8.8	
12	456							564									39	69	12.2	
5	479								705								41	185	26.2	
4	427									561							37	97	17.3	
3	426										611						36	149	24.4	
2	458											679					39	182	26.8	
2	428												683				37	218	31.9	
1	368													721			32	321	44.5	
1	373															480	12	95	19.8	

TABLE 8.—*Comparison of average initial and retest records of Guernseys having initial records made at age of 4 years (single-letter records)*

Number of cows	Average initial butterfat record made at 4 to 4½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)														Increase due to age	Portion of reentry record due to development		Average due to development for this group
		5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12				
	Pounds															*Pounds*	*Pounds*	*Per cent*	*Per cent*
13	501	607	---	---	---	---	---	---	---	---	---	---	---	---	---	23	83	13. 7	13. 3
14	506	---	580	---	---	---	---	---	---	---	---	---	---	---	---	24	50	8. 6	
10	457	---	---	626	---	---	---	---	---	---	---	---	---	---	---	21	148	23. 6	
16	464	---	---	---	566	---	---	---	---	---	---	---	---	---	---	22	80	14. 1	
8	442	---	---	---	---	516	---	---	---	---	---	---	---	---	---	20	54	10. 5	
1	401	---	---	---	---	---	425	---	---	---	---	---	---	---	---	19	5	1. 2	
4	473	---	---	---	---	---	---	574	---	---	---	---	---	---	---	22	79	13. 8	
2	471	---	---	---	---	---	---	---	575	---	---	---	---	---	---	22	82	14. 3	
3	481	---	---	---	---	---	---	---	---	539	---	---	---	---	---	22	36	6. 7	
2	394	---	---	---	---	---	---	---	---	---	484	---	---	---	---	18	72	14. 9	
1	507	---	---	---	---	---	---	---	---	---	---	590	---	---	---	24	59	10. 0	
1	507	---	---	---	---	---	---	---	---	---	---	---	---	477	---	−2	−28	−5. 9	
1	346	---	---	---	---	---	---	---	---	---	---	---	---	---	481	−2	137	28. 5	
	Made at 4½ to 5 years old																		
9	442	---	540	---	---	---	---	---	---	---	---	---	---	---	---	18	80	14. 8	16. 0
9	526	---	---	606	---	---	---	---	---	---	---	---	---	---	---	21	59	9. 7	
4	517	---	---	---	725	---	---	---	---	---	---	---	---	---	---	21	187	25. 8	
8	559	---	---	---	---	683	---	---	---	---	---	---	---	---	---	23	101	14. 8	
3	506	---	---	---	---	---	636	---	---	---	---	---	---	---	---	20	110	17. 3	
4	452	---	---	---	---	---	---	593	---	---	---	---	---	---	---	18	123	20. 7	
2	420	---	---	---	---	---	---	---	561	---	---	---	---	---	---	17	124	22. 1	
1	386	---	---	---	---	---	---	---	---	---	594	---	---	---	---	15	193	32. 5	
1	445	---	---	---	---	---	---	---	---	---	---	---	462	---	---	18	−1	−0. 2	
1	483	---	---	---	---	---	---	---	---	---	---	---	---	---	601	−5	123	20. 5	

TABLE 9.—*Comparison of average initial and retest records of Guernseys having initial records made at age of 5 years (single-letter records)*

Number of cows	Average initial butterfat record made at 5 to 5½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)								Increase due to age	Portion of reentry record due to development		Average due to development for this group
		6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10				
	Pounds									*Pounds*	*Pounds*	*Per cent*	*Per cent*
7	534	594	-----	-----	-----	-----	-----	-----	-----	0	60	10. 1	9. 2
7	517	-----	541	-----	-----	-----	-----	-----	-----	0	24	4. 4	
2	496	-----	-----	498	-----	-----	-----	-----	-----	0	2	0. 4	
1	552	-----	-----	-----	571	-----	-----	-----	-----	0	19	3. 3	
3	458	-----	-----	-----	-----	579	-----	-----	-----	0	121	20. 9	
1	404	-----	-----	-----	-----	-----	487	-----	-----	0	83	17. 0	
1	454	-----	-----	-----	-----	-----	-----	555	-----	0	101	18. 1	
	Made at 5½ to 6 years old												
5	500	-----	546	-----	-----	-----	-----	-----	-----	0	46	8. 4	16. 8
4	549	-----	-----	644	-----	-----	-----	-----	-----	0	95	14. 8	
1	561	-----	-----	-----	710	-----	-----	-----	-----	0	149	21. 0	
8	494	-----	-----	-----	-----	592	-----	-----	-----	0	98	16. 6	
2	477	-----	-----	-----	-----	-----	683	-----	-----	0	206	30. 2	
1	438	-----	-----	-----	-----	-----	-----	657	-----	0	219	33. 3	
2	492	-----	-----	-----	-----	-----	-----	-----	608	0	116	19. 1	

TABLE 10.—*Comparison of average initial and retest records of Guernseys having initial records made at age of 6 years (single-letter records)*

Number of cows	Average initial butterfat record made at 6 to 6½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)										Increase due to age	Portion of reentry record due to development		Average due to development for this group
		7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12				
	Pounds											*Pounds*	*Pounds*	*Per cent*	*Per cent*
5	500	723	---	---	---	---	---	---	---	---	---	0	223	30.8	20.7
6	468	---	607	---	---	---	---	---	---	---	---	0	139	22.9	
2	419	---	---	417	---	---	---	---	---	---	---	0	−2	−0.5	
3	567	---	---	---	701	---	---	---	---	---	---	0	134	19.1	
4	475	---	---	---	---	677	---	---	---	---	---	0	202	29.8	
2	411	---	---	---	---	---	543	---	---	---	---	0	132	24.3	
1	500	---	---	---	---	---	---	505	---	---	---	0	5	1.0	
3	529	---	---	---	---	---	---	---	619	---	---	0	90	14.5	
1	845	---	---	---	---	---	---	---	---	792	---	−41	−12	−1.5	
1	464	---	---	---	---	---	---	---	---	---	563	−23	122	21.7	
	Made at 6½ to 7 years old														
2	456	---	510	---	---	---	---	---	---	---	---	0	54	10.6	14.1
12	512	---	---	602	---	---	---	---	---	---	---	0	90	15.0	
1	499	---	---	---	494	---	---	---	---	---	---	0	−5	−1.0	
2	487	---	---	---	---	617	---	---	---	---	---	0	130	12.1	
2	470	---	---	---	---	---	510	---	---	---	---	0	40	7.8	
1	631	---	---	---	---	---	---	---	679	---	---	0	48	7.1	
1	470	---	---	---	---	---	---	---	---	640	---	−23	193	30.2	

TABLE 11.—*Comparison of average initial and retest records of Guernseys having initial records made at ages of 7 and 8 years (single-letter records)*

Number of cows	Average initial butterfat record made at 7 to 7½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)										Increase due to age	Portion of reentry record due to development		Average due to development for this group
		8 to 8½	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12	12 to 12½	12½ to 13	14 to 14½				
	Pounds											*Pounds*	*Pounds*	*Per cent*	*Per cent*
3	460	538	---	---	---	---	---	---	---	---	---	0	78	14.5	21.6
3	459	---	643	---	---	---	---	---	---	---	---	0	184	28.6	
2	496	---	---	594	---	---	---	---	---	---	---	0	98	16.5	
1	438	---	---	---	---	---	---	490	---	---	---	−21	73	14.9	
1	485	---	---	---	---	---	---	---	---	702	---	−24	241	34.3	
1	380	---	---	---	---	---	---	---	---	---	490	−19	129	26.3	
	Made at 7½ to 8 years old														
5	576	---	664	---	---	---	---	---	---	---	---	0	88	13.3	12.6
1	502	---	---	537	---	---	---	---	---	---	---	0	35	6.5	
1	371	---	---	---	373	---	---	---	---	---	---	0	2	0.5	
1	371	---	---	---	---	---	486	---	---	---	---	−18	133	27.4	
	Made at 8 to 8½ years old														
1	493	---	---	496	---	---	---	---	---	---	---	0	3	0.6	14.5
1	501	---	---	---	582	---	---	---	---	---	---	0	81	13.9	
1	535	---	---	---	---	---	---	---	717	---	---	−26	208	29.0	
	Made at 8½ to 9 years old														
2	471	---	---	600	---	---	---	---	---	---	---	0	129	21.5	17.8
4	501	---	---	---	562	---	---	---	---	---	---	0	61	10.9	
2	531	---	---	---	---	710	---	---	---	---	---	0	179	25.2	
1	572	---	---	---	---	---	---	708	---	---	---	−28	164	23.2	

TABLE 12.—*Comparison of average initial and retest records of Guernseys having initial records made at age of 9 years or older (single-letter records)*

Number of cows	Average initial butterfat record made at 9 to 9½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)						Increase due to age	Portion of reentry record due to development		Average due to development for this group
		11 to 11½	11½ to 12	12 to 12½	12½ to 13	13 to 13½	14½ to 15				
	Pounds							*Pounds*	*Pounds*	*P. C.*	*Per cent*
1	494	------	488	------	------	------	------	−24	18	3.7	4.8
1	581	------	------	587	------	------	------	−28	34	5.8	
	Made at 9½ to 10 years old										
1	434	481	------	------	------	------	------	−21	68	14.1	10.4
1	601	------	------	------	------	613	------	−29	41	6.7	
	Made at 10 to 10½ years old										
1	392	------	506	------	------	------	------	−19	133	26.3	26.3
	Made at 11 to 11½ years old										
1	433	------	------	------	530	------	------	0	97	18.3	18.3
	Made at 12 to 12½ years old										
1	410	------	------	------	------	493	------	0	83	16.8	16.8
	Made at 13½ to 14 years old										
1	609	------	------	------	------	------	713	0	104	14.6	14.6

TABLE 13.—*Comparison of average initial and retest records of Jerseys having initial records made at age less than 2 years (class A and class AA records)*

Number of cows	Average initial butterfat record made under 2 years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)															Increase due to age	Portion of reentry record due to development		Average due to development for this group
		2½ to 3	3 to 3½	3½ to 4	4 to 4½	4½ to 5	5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	11 to 11½				
	Pounds																*Pounds*	*Pounds*	*Per cent*	*Per cent*
51	340	412	---	---	---	---	---	---	---	---	---	---	---	---	---	---	43	29	7.0	10.2
127	357	---	452	---	---	---	---	---	---	---	---	---	---	---	---	---	64	31	6.9	
40	342	---	---	480	---	---	---	---	---	---	---	---	---	---	---	---	80	58	12.1	
71	343	---	---	---	508	---	---	---	---	---	---	---	---	---	---	---	97	68	13.4	
36	358	---	---	---	---	525	---	---	---	---	---	---	---	---	---	---	116	51	9.7	
28	359	---	---	---	---	---	545	---	---	---	---	---	---	---	---	---	119	67	12.3	
25	365	---	---	---	---	---	---	574	---	---	---	---	---	---	---	---	134	75	13.1	
16	354	---	---	---	---	---	---	---	551	---	---	---	---	---	---	---	133	64	11.6	
11	387	---	---	---	---	---	---	---	---	548	---	---	---	---	---	---	145	16	2.9	
7	365	---	---	---	---	---	---	---	---	---	607	---	---	---	---	---	137	105	17.3	
8	369	---	---	---	---	---	---	---	---	---	---	571	---	---	---	---	139	63	11.0	
3	336	---	---	---	---	---	---	---	---	---	---	---	715	---	---	---	126	253	35.4	
1	330	---	---	---	---	---	---	---	---	---	---	---	---	785	---	---	124	331	42.2	
2	310	---	---	---	---	---	---	---	---	---	---	---	---	---	504	---	117	77	15.3	
2	328	---	---	---	---	---	---	---	---	---	---	---	---	---	---	662	123	211	31.9	

TABLE 14.—*Comparison of average initial and retest records of Jerseys having initial records made at age of 2 years (class A and class AA)*

Number of cows	Average initial butterfat record made at 2 to 2½ years old	Average reentry records made at ages shown by same cows as initial records in column at left (pounds of butterfat)																						Increase due to age	Portion of reentry record due to development		Average due to development for this group
		3 to 3½	3½ to 4	4 to 4½	4½ to 5	5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12	13 to 13½	14 to 14½	14½ to 15	15½ to 16				
	Pounds																							*Pounds*	*Pounds*	*P. Ct.*	*Per cent*
240	384	476	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	37	55	11. 5	
218	395	-----	494	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	59	40	8. 1	11. 9
168	367	-----	-----	496	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	72	57	11. 5	
152	391	-----	-----	-----	553	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	92	70	12. 7	
105	388	-----	-----	-----	-----	535	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	94	53	9. 9	
91	375	-----	-----	-----	-----	-----	570	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	103	92	16. 1	
64	381	-----	-----	-----	-----	-----	-----	548	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	108	59	10. 8	
43	382	-----	-----	-----	-----	-----	-----	-----	561	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	108	71	12. 7	
36	365	-----	-----	-----	-----	-----	-----	-----	-----	563	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	103	95	16. 9	
35	366	-----	-----	-----	-----	-----	-----	-----	-----	-----	567	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	104	97	17. 1	
13	364	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	589	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	103	122	20. 7	
12	332	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	549	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	94	123	22. 4	
3	322	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	441	-----	-----	-----	-----	-----	-----	-----	-----	-----	91	28	6. 4	
6	363	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	632	-----	-----	-----	-----	-----	-----	-----	-----	102	167	26. 4	
2	279	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	490	-----	-----	-----	-----	-----	-----	-----	79	132	26. 9	
2	393	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	732	-----	-----	-----	-----	-----	95	244	33. 3	
2	365	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	528	-----	-----	-----	88	75	14. 2	
1	396	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	567	-----	57	114	20. 1	
1	396	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	683	57	230	33. 7	
	Made at 2½ to 3 years old																										
116	395	-----	485	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	38	52	10. 7	11. 6
99	404	-----	-----	523	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	57	62	11. 9	
53	407	-----	-----	-----	514	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	72	35	6. 8	
60	399	-----	-----	-----	-----	535	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	74	62	11. 6	
32	406	-----	-----	-----	-----	-----	546	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	87	53	9. 7	
43	409	-----	-----	-----	-----	-----	-----	574	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	91	74	12. 9	
24	387	-----	-----	-----	-----	-----	-----	-----	573	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	86	100	17. 5	
18	424	-----	-----	-----	-----	-----	-----	-----	-----	569	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	94	51	9. 0	
15	412	-----	-----	-----	-----	-----	-----	-----	-----	-----	609	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	92	105	17. 2	
12	407	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	571	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	90	74	13. 0	
8	432	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	631	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	96	103	16. 3	
6	399	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	545	-----	-----	-----	-----	-----	-----	-----	-----	-----	89	57	10. 5	
2	347	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	593	-----	-----	-----	-----	-----	-----	-----	-----	77	169	28. 5	
3	409	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	692	-----	-----	-----	-----	-----	-----	-----	91	192	27. 7	
3	407	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	622	-----	-----	-----	-----	-----	-----	75	140	22. 5	
1	442	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	588	-----	-----	-----	-----	-----	81	65	11. 1	
1	473	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	461	-----	-----	-----	-----	87	−99	−21. 5	
1	442	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	585	-----	-----	40	103	17. 6	

TABLE 15.—*Comparison of average initial and retest records of Jerseys having initial records made at age of 3 years* (*class A and class AA records*)

Number of cows	Average initial butterfat record made at 3 to 3½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)																	Increase due to age	Portion of reentry record due to development		Average due to development for this group
		4 to 4½	4½ to 5	5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	12 to 12½	12½ to 13				
	Pounds																		*Pounds*	*Pounds*	*P. ct.*	*P. ct.*
84	421	498	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	37	40	8.0	8.7
68	434	---	508	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	54	20	3.9	
56	419	---	---	525	---	---	---	---	---	---	---	---	---	---	---	---	---	---	55	51	9.7	
53	420	---	---	---	518	---	---	---	---	---	---	---	---	---	---	---	---	---	68	30	5.8	
30	421	---	---	---	---	582	---	---	---	---	---	---	---	---	---	---	---	---	71	90	15.5	
29	401	---	---	---	---	---	536	---	---	---	---	---	---	---	---	---	---	---	68	67	12.5	
23	465	---	---	---	---	---	---	603	---	---	---	---	---	---	---	---	---	---	78	60	10.0	
20	420	---	---	---	---	---	---	---	550	---	---	---	---	---	---	---	---	---	71	59	10.7	
15	428	---	---	---	---	---	---	---	---	549	---	---	---	---	---	---	---	---	72	49	8.9	
7	453	---	---	---	---	---	---	---	---	---	529	---	---	---	---	---	---	---	76	0	0.0	
3	444	---	---	---	---	---	---	---	---	---	---	620	---	---	---	---	---	---	75	101	16.3	
5	421	---	---	---	---	---	---	---	---	---	---	---	542	---	---	---	---	---	71	50	9.2	
8	412	---	---	---	---	---	---	---	---	---	---	---	---	514	---	---	---	---	69	33	6.4	
4	437	---	---	---	---	---	---	---	---	---	---	---	---	---	560	---	---	---	57	66	11.8	
1	437	---	---	---	---	---	---	---	---	---	---	---	---	---	---	555	---	---	57	61	11.0	
2	424	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	709	---	55	230	32.4	
	Made at 3½ to 4 years old																					
61	423	---	514	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	31	60	11.7	11.5
57	446	---	---	532	---	---	---	---	---	---	---	---	---	---	---	---	---	---	36	50	9.4	
33	431	---	---	---	519	---	---	---	---	---	---	---	---	---	---	---	---	---	47	41	7.9	
41	416	---	---	---	---	495	---	---	---	---	---	---	---	---	---	---	---	---	48	31	6.3	
16	446	---	---	---	---	---	550	---	---	---	---	---	---	---	---	---	---	---	51	53	9.6	
14	432	---	---	---	---	---	---	581	---	---	---	---	---	---	---	---	---	---	50	99	17.0	
11	374	---	---	---	---	---	---	---	508	---	---	---	---	---	---	---	---	---	43	91	17.9	
7	407	---	---	---	---	---	---	---	---	560	---	---	---	---	---	---	---	---	47	106	18.9	
11	409	---	---	---	---	---	---	---	---	---	618	---	---	---	---	---	---	---	47	162	26.2	
5	422	---	---	---	---	---	---	---	---	---	---	547	---	---	---	---	---	---	49	76	13.9	
3	430	---	---	---	---	---	---	---	---	---	---	---	678	---	---	---	---	---	50	198	29.2	
2	460	---	---	---	---	---	---	---	---	---	---	---	---	641	---	---	---	---	53	128	20.0	
3	440	---	---	---	---	---	---	---	---	---	---	---	---	---	548	---	---	---	35	73	13.3	
1	512	---	---	---	---	---	---	---	---	---	---	---	---	---	---	741	---	---	41	188	25.4	
2	515	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	665	41	109	16.4	

TABLE 16.—*Comparison of average initial and retest records of Jerseys having initial records made at age of 4 years (class A and class AA records)*

Number of cows	Average initial butterfat record made at 4 to 4½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)															Increase due to age	Portion of reentry record due to development		Average due to development for this group
		5 to 5½	5½ to 6	6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12	12½ to 13				
	Pounds																*Pounds*	*Pounds*	*P. ct.*	*Per cent*
66	436	488	---	---	---	---	---	---	---	---	---	---	---	---	---	---	17	35	7.2	10.3
53	453	---	540	---	---	---	---	---	---	---	---	---	---	---	---	---	30	57	10.6	
19	436	---	---	502	---	---	---	---	---	---	---	---	---	---	---	---	32	34	6.8	
21	444	---	---	---	526	---	---	---	---	---	---	---	---	---	---	---	32	50	9.5	
23	470	---	---	---	---	574	---	---	---	---	---	---	---	---	---	---	34	70	12.2	
12	424	---	---	---	---	---	569	---	---	---	---	---	---	---	---	---	31	114	20.0	
11	477	---	---	---	---	---	---	600	---	---	---	---	---	---	---	---	35	88	14.7	
7	512	---	---	---	---	---	---	---	642	---	---	---	---	---	---	---	37	93	14.5	
3	454	---	---	---	---	---	---	---	---	555	---	---	---	---	---	---	33	68	12.3	
2	458	---	---	---	---	---	---	---	---	---	540	---	---	---	---	---	33	49	9.1	
2	419	---	---	---	---	---	---	---	---	---	---	512	---	---	---	---	30	63	12.3	
2	368	---	---	---	---	---	---	---	---	---	---	---	408	---	---	---	14	26	6.4	
1	389	---	---	---	---	---	---	---	---	---	---	---	---	589	---	---	15	185	31.4	
2	458	---	---	---	---	---	---	---	---	---	---	---	---	---	548	---	18	72	13.1	
	Made at 4½ to 5 years old																			
39	449	---	513	---	---	---	---	---	---	---	---	---	---	---	---	---	15	49	9.6	11.5
29	479	---	---	567	---	---	---	---	---	---	---	---	---	---	---	---	19	69	12.2	
22	468	---	---	---	528	---	---	---	---	---	---	---	---	---	---	---	19	41	7.8	
19	435	---	---	---	---	515	---	---	---	---	---	---	---	---	---	---	19	63	12.2	
4	519	---	---	---	---	---	531	---	---	---	---	---	---	---	---	---	20	−8	−1.5	
12	466	---	---	---	---	---	---	558	---	---	---	---	---	---	---	---	18	74	13.3	
4	464	---	---	---	---	---	---	---	706	---	---	---	---	---	---	---	18	224	31.7	
9	416	---	---	---	---	---	---	---	---	557	---	---	---	---	---	---	16	125	22.4	
5	485	---	---	---	---	---	---	---	---	---	630	---	---	---	---	---	19	126	20.0	
1	535	---	---	---	---	---	---	---	---	---	---	406	---	---	---	---	21	−150	−36.9	
1	537	---	---	---	---	---	---	---	---	---	---	---	488	---	---	---	4	−53	−10.9	
2	443	---	---	---	---	---	---	---	---	---	---	---	---	539	---	---	3	93	17.3	
1	437	---	---	---	---	---	---	---	---	---	---	---	---	---	---	457	3	17	3.7	

TABLE 17.—*Comparison of average initial and retest records of Jerseys having initial records made at age of 5 years (class A and class AA records)*

Number of cows	Average initial butterfat record made at 5 to 5½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)														Increase due to age	Portion of reentry record due to development		Average due to development for this group
		6 to 6½	6½ to 7	7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12	12½ to 13	14 to 14½				
	Pounds															*Pounds*	*Pounds*	*P. ct.*	*Per cent*
26	456	508	---	---	---	---	---	---	---	---	---	---	---	---	---	15	37	7.3	11.7
35	477	---	556	---	---	---	---	---	---	---	---	---	---	---	---	16	63	11.3	
17	452	---	---	537	---	---	---	---	---	---	---	---	---	---	---	15	70	13.0	
12	497	---	---	---	553	---	---	---	---	---	---	---	---	---	---	17	39	7.1	
8	434	---	---	---	---	575	---	---	---	---	---	---	---	---	---	14	127	22.1	
8	451	---	---	---	---	---	543	---	---	---	---	---	---	---	---	15	77	14.2	
9	532	---	---	---	---	---	---	667	---	---	---	---	---	---	---	17	118	17.7	
3	444	---	---	---	---	---	---	---	554	---	---	---	---	---	---	15	95	17.1	
2	422	---	---	---	---	---	---	---	---	410	---	---	---	---	---	14	−26	−6.3	
1	498	---	---	---	---	---	---	---	---	---	588	---	---	---	---	0	90	15.3	
1	384	---	---	---	---	---	---	---	---	---	---	---	---	529	---	0	145	27.4	
	Made at 5½ to 6 years old																		
36	458	---	520	---	---	---	---	---	---	---	---	---	---	---	---	3	59	11.3	11.1
24	510	---	---	573	---	---	---	---	---	---	---	---	---	---	---	3	60	10.5	
20	467	---	---	---	552	---	---	---	---	---	---	---	---	---	---	3	82	14.9	
19	495	---	---	---	---	567	---	---	---	---	---	---	---	---	---	3	69	12.2	
4	452	---	---	---	---	---	485	---	---	---	---	---	---	---	---	3	30	6.2	
4	536	---	---	---	---	---	---	570	---	---	---	---	---	---	---	3	31	5.4	
5	508	---	---	---	---	---	---	---	499	---	---	---	---	---	---	3	−12	−2.4	
1	536	---	---	---	---	---	---	---	---	494	---	---	---	---	---	3	−45	−9.1	
3	503	---	---	---	---	---	---	---	---	---	542	---	---	---	---	−13	52	9.6	
2	531	---	---	---	---	---	---	---	---	---	---	661	---	---	---	−14	144	21.8	
2	429	---	---	---	---	---	---	---	---	---	---	---	608	---	---	−11	190	31.3	
3	495	---	---	---	---	---	---	---	---	---	---	---	---	471	---	−13	−11	−2.3	
1	361	---	---	---	---	---	---	---	---	---	---	---	---	---	506	−37	182	36.0	

TABLE 18.—*Comparison of average initial and retest records of Jerseys having initial records made at age of 6 years (class A and class AA records)*

Number of cows	Average initial butterfat record made at 6 to 6½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)											Increase due to age	Portion of reentry record due to development		Average due to development for this group
		7 to 7½	7½ to 8	8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	11 to 11½	11½ to 12	12 to 12½	15 to 15½				
	Pounds												*Pounds*	*Pounds*	*P. ct.*	*Per cent*
34	494	549	---	---	---	---	---	---	---	---	---	---	0	55	10.0	9.8
23	523	---	548	---	---	---	---	---	---	---	---	---	0	25	4.6	
10	520	---	---	565	---	---	---	---	---	---	---	---	0	45	8.0	
10	453	---	---	---	517	---	---	---	---	---	---	---	0	64	12.4	
4	472	---	---	---	---	557	---	---	---	---	---	---	0	85	15.3	
3	464	---	---	---	---	---	562	---	---	---	---	---	0	98	17.4	
1	415	---	---	---	---	---	---	724	---	---	---	---	0	309	42.7	
1	408	---	---	---	---	---	---	---	376	---	---	---	−13	−19	−5.1	
4	509	---	---	---	---	---	---	---	---	695	---	---	−16	202	29.1	
1	604	---	---	---	---	---	---	---	---	---	452	---	−19	−133	−29.4	
	Made at 6½ to 7 years old															
25	452	---	519	---	---	---	---	---	---	---	---	---	0	67	12.9	8.0
14	563	---	---	591	---	---	---	---	---	---	---	---	0	28	4.7	
2	563	---	---	---	530	---	---	---	---	---	---	---	0	−33	−6.2	
8	518	---	---	---	---	560	---	---	---	---	---	---	0	42	7.5	
2	423	---	---	---	---	---	416	---	---	---	---	---	0	−7	−1.7	
1	473	---	---	---	---	---	---	508	---	---	---	---	0	35	6.9	
1	594	---	---	---	---	---	---	---	852	---	---	---	−19	277	32.5	
1	425	---	---	---	---	---	---	---	---	381	---	---	−14	−30	−7.9	
1	529	---	---	---	---	---	---	---	---	---	---	502	−57	30	6.0	

TABLE 19.—*Comparison of average initial and retest records of Jerseys having initial records made at ages of 7 and 8 years (class A and class AA records)*

Number of cows	Average initial butterfat record made at 7 to 7½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)													Increase due to age	Portion of reentry record due to development		Average due to development for this group
		8 to 8½	8½ to 9	9 to 9½	9½ to 10	10 to 10½	10½ to 11	11 to 11½	11½ to 12	12 to 12½	12½ to 13	13 to 13½	13½ to 14	14½ to 15				
	Pounds														*Pounds*	*Pounds*	*P. ct.*	*Per cent*
19	488	517													0	29	5.6	6.3
14	519		559												0	40	7.1	
3	559			488											0	−71	−14.5	
10	471				492										0	21	4.3	
2	434					462									0	28	6.1	
2	433						573								−14	154	26.9	
1	394													683	−42	331	48.5	
	Made at 7½ to 8 years old																	
6	468		580												0	112	19.3	13.8
10	501			540											0	39	7.2	
1	433				510										0	77	15.1	
1	500					457									0	−43	−9.4	
1	493						591								−16	114	19.3	
1	487								829						−15	357	43.1	
2	485										620				−15	150	24.2	
1	502											555			−16	69	12.4	
	Made at 8 to 8½ years old																	
10	477			534											0	57	10.7	8.1
11	523				556										0	33	5.9	
5	512					565									0	53	9.4	
2	463						501								−15	53	10.6	
3	518							535							−17	34	6.4	
1	432								663						−14	245	37.0	
1	531												397		−17	−117	−29.5	
	Made at 8½ to 9 years old																	
6	429				504										0	75	14.9	14.8
1	491					485									0	−6	−1.2	
2	383						596								−12	225	37.8	
2	531								547						−17	33	6.0	
1	398									383					−13	−2	−0.5	
1	389										456				−12	79	17.3	

TABLE 20.—*Comparison of average initial and retest records of Jerseys having initial records made at ages of 9 and 10 years (class A and class AA records)*

Number of cows	Average initial butterfat record made at 9 to 9½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)								Increase due to age	Portion of reentry record due to development		Average due to development for this group
		10 to 10½	10½ to 11	11 to 11½	11½ to 12	12 to 12½	12½ to 13	13½ to 14	14½ to 15				
	Pounds									*Pounds*	*Pounds*	*P. ct.*	*Per cent*
7	450	516								0	66	12.8	13.8
3	480		657							−15	192	29.2	
1	407			425						−13	31	7.3	
1	471				382					−15	−74	−19.4	
	Made at 9½ to 10 years old												
2	652		741							−21	110	14.8	5.4
1	495			539						−16	60	11.1	
1	385				395					−12	22	5.6	
1	495					404				−16	−75	−18.6	
1	495							503		−16	24	4.8	
	Made at 10 to 10½ years old												
7	434			483						−16	15	3.1	7.4
1	426				425					−13	12	2.8	
2	392					500				−12	120	24.0	
2	430						452			−14	36	8.0	
	Made at 10½ to 11 years old												
3	518				461					0	−57	−12.4	−5.8
1	501					478				0	−23	−4.8	
1	573								606	−45	78	12.9	

TABLE 21.—*Comparison of average initial and retest records of Jerseys having initial records made at age of 11 years or over (class A and class AA records)*

Number of cows	Average initial butterfat record made at 11 to 11½ years old	Average reentry records made at ages shown in these columns by same cows as initial records shown in column at left (pounds of butterfat)											Increase due to age	Portion of reentry record due to development		Average due to development for this group
		12 to 12½	12½ to 13	13 to 13½	14 to 14½	14½ to 15	15 to 15½	16 to 16½	16½ to 17	17½ to 18	18 to 18½	19 to 19½				
	Pounds												*Pounds*	*Pounds*	*P. ct.*	*Per cent*
2	395	430	---	---	---	---	---	---	---	---	---	---	0	35	8.1	8.1
	Made at 11½ to 12 years old															
3	417	---	421	---	---	---	---	---	---	---	---	---	0	4	1.0	1.0
	Made at 12 to 12½ years old															
2	475	---	---	512	---	---	---	---	---	---	---	---	0	37	7.2	5.5
1	441	---	---	---	---	---	---	---	---	---	413	---	−37	9	2.2	---
	Made at 13 to 13½ years old															
1	482	---	---	---	431	---	---	---	---	---	---	---	−38	−13	−3.0	---
1	364	---	---	---	---	509	---	---	---	---	---	---	−28	173	34.0	13.1
1	476	---	---	---	---	---	479	---	---	---	---	---	−37	40	8.4	---
	Made at 13½ to 14 years old															
1	483	---	---	---	---	---	579	---	---	---	---	---	−38	134	23.1	19.0
1	483	---	---	---	---	---	---	523	---	---	---	---	−38	78	14.9	---
	Made at 14 to 14½ years old															
1	487	---	---	---	---	---	523	---	---	---	---	---	0	36	6.9	---
1	487	---	---	---	---	---	---	---	530	---	---	---	0	43	8.1	10.8
1	487	---	---	---	---	---	---	---	---	590	---	---	0	103	17.5	---
	Made at 18 to 18½ years old															
1	401	---	---	---	---	---	---	---	---	---	---	401	0	0	0.0	0.0

It is a natural assumption that there is a rather high correlation between the initial and reentry records of the same cow or group of cows. Tables 23 and 22 give the distribution of the 240 Jerseys having initial records made at 2 to 2½ years of age and reentry records made when 3 to 3½ years old, and of the 106 Guernsey cows having initial records made when 2 to 2½ years old and reentry records made at 3½ to 4 years of age. The coefficient of correlation of these Jersey records is 0.6318 ± 0.0262, and of the Guernseys, 0.7247 ± 0.0311. These two groups were selected because they contain the largest number of individuals of all of the groups of their respective breeds.

Table 22.—*Distribution of initial and reentry records of Guernsey cows, initial records made at 2 to 2½ years of age and reentry records at 3½ to 4 years of age*

Initial butterfat records (pounds)	Reentry records (pounds of butterfat)																							Total
	350 to 374	375 to 399	400 to 424	425 to 449	450 to 474	475 to 499	500 to 524	525 to 549	550 to 574	575 to 599	600 to 624	625 to 649	650 to 674	675 to 699	700 to 724	725 to 749	750 to 774	775 to 799	800 to 824	825 to 849	850 to 874	875 to 899	900 to 924	
250 to 274		1																						1
275 to 299	1	2																						3
300 to 324			1								1													2
325 to 349	1	1	2	2		1																		7
350 to 374		2	1	2		1	1			1	1		1											10
375 to 399		1	4	1	2		1		1	1		1												12
400 to 424				2	2	3	2	2		1		1	1											14
425 to 449			1	1	1	1	2		1	1		1												9
450 to 474							1	1	3	3				1										9
475 to 499					2	1	2			2	2	1		1				1						12
500 to 524						1		1	2		1	3	3		1									12
525 to 549								1					1											2
550 to 574												1	1		1				2					5
600 to 624														1	1				1					3
625 to 649																	1	1						2
650 to 674														1										1
675 to 699																								
700 to 724																							1	1
725 to 749																	1							1
Total	2	7	9	8	7	8	9	5	7	9	5	8	7	4	3		2	2	3				1	106

Table 23.—*Distribution of initial and reentry records of Jersey cows, initial records made at 2 to 2½ years of age and reentry records at 3 to 3½ years of age*

Initial butterfat records (pounds)	Reentry records (pounds of butterfat)																								Total
	300 to 324	325 to 349	350 to 374	375 to 399	400 to 424	425 to 449	450 to 474	475 to 499	500 to 524	525 to 549	550 to 574	575 to 599	600 to 624	625 to 649	650 to 674	675 to 699	700 to 724	725 to 749	750 to 774	775 to 799	800 to 824	825 to 849	850 to 874	875 to 899	
250 to 274	4	5	1		3	1																			14
275 to 299	3	1	2				5	1				1	1	1											15
300 to 324	1	8	3	8	5	4		2		1	1														33
325 to 349		3	5	6	4	3	3	2	1	2	2	1	1			1									34
350 to 374	3	1	2	4	1	4	5	1	1	2	2	2													28
375 to 399	1		2	2	4	2	2	7	3	3	3	1	2												32
400 to 424					2	3	2	4	4	1	2	2			1		1								22
425 to 449	1	1					3	2	2			2		3	1	1		2							18
450 to 474		1				1	1	1		2	1	1				2			1						11
475 to 499		1	1		2	1					2	1							1						9
500 to 524										1	1	1	1			1									5
525 to 549								1	2			1	1	1			2								8
550 to 574											1	1					1			1					4
575 to 599													1			1	1								3
600 to 624												1					1								2
625 to 649																								1	1
650 to 674																									1
675 to 699																									
700 to 724																									
725 to 749																									
750 to 774																						1			
Total	13	21	16	20	21	19	21	21	13	12	15	15	7	5	2	6	6	2	2	1		1		1	240

The following reasons are usually given for retesting cows:

(1) Those that have shown unusual ability during the first test are retested with the hope of making a still more creditable record.

(2) The cow of good breeding whose initial record did not come up to expectations is retested with the hope that on the next test she

will show improvement, not only for her own sake, but also to add prestige to the family of which she is a member.

(3) The cow that failed to come up to expectations on her first test because of injury or some other known reason is retested in order to obtain a normal and better record.

Tables 24 and 25 were prepared in order to determine whether the cows retested were better or poorer producers on the average than all tested cows.

TABLE 24.—*Average initial butterfat records of all advanced-registry Guernsey cows and those of cows retested (classified according to age at time of initial test)*

Age	Initial records of all cows		Initial records of cows retested		Age	Initial records of all cows		Initial records of cows retested	
	Number	Butterfat	Number	Butterfat		Number	Butterfat	Number	Butterfat
		Pounds		*Pounds*			*Pounds*		*Pounds*
Under 2 years	275	368	55	381	7 to 7½ years	179	495	11	465
2 to 2½ years	2,367	404	449	427	7½ to 8 years	148	499	8	516
2½ to 3 years	1,211	424	215	441	8 to 8½ years	135	496	3	510
3 to 3½ years	897	433	146	443	8½ to 9 years	88	495	9	509
3½ to 4 years	695	453	99	463	9 to 9½ years	102	502	2	538
4 to 4½ years	625	470	76	473	9½ to 10 years	80	496	2	518
4½ to 5 years	432	473	42	494	10 to 10½ years	45	493	1	392
5 to 5½ years	373	495	22	506	11 to 11½ years	28	459	1	433
5½ to 6 years	313	489	23	504	12 to 12½ years	13	504	1	410
6 to 6½ years	305	482	28	499	13½ to 14 years	8	494	1	609
6½ to 7 years	214	487	21	503					

TABLE 25.—*Average initial butterfat records of all register-of-merit Jersey cows and those of cows retested (classified according to age at time of initial test)*

Age	Initial records of all cows		Initial records of cows retested		Age	Initial records of all cows		Initial records of cows retested	
	Number	Butterfat	Number	Butterfat		Number	Butterfat	Number	Butterfat
		Pounds		*Pounds*			*Pounds*		*Pounds*
Under 2 years	1,237	343	428	352	8 to 8½ years	267	480	33	501
2 to 2½ years	3,633	368	1,194	382	8½ to 9 years	232	462	13	437
2½ to 3 years	1,613	386	497	403	9 to 9½ years	163	468	12	456
3 to 3½ years	1,398	404	408	425	9½ to 10 years	128	475	6	529
3½ to 4 years	1,011	423	267	428	10 to 10½ years	114	476	12	455
4 to 4½ years	923	440	224	448	10½ to 11 years	68	459	5	526
4½ to 5 years	705	454	148	460	11 to 11½ years	53	454	2	395
5 to 5½ years	673	457	122	468	11½ to 12 years	39	478	3	417
5½ to 6 years	587	469	124	478	12 to 12½ years	40	445	3	463
6 to 6½ years	509	475	91	498	13 to 13½ years	18	445	3	441
6½ to 7 years	404	471	55	497	13½ to 14 years	11	475	2	483
7 to 7½ years	395	468	51	491	14 to 14½ years	6	439	3	487
7½ to 8 years	310	470	23	487					

Except in some of the older classes having only a small number of individuals, the animals retested had initial records above the average for all cows in the group of that age. This fact has no bearing on the information given in Tables 5 to 21, as allowance is made for this difference between the initial records of the animals under consideration and the average of all initial records, and the difference is carried into the factor representing the increase due to age. The factor of development is not affected.

EFFECT OF PREGNANCY

That pregnancy has a pronounced influence on the quantity of butterfat produced during a year when the calf is carried for a period of 265 days or longer is evidenced by the average of 408 pounds of butterfat for 711 class GG records as compared with an average of 418 pounds of butterfat for 4,794 class G records of the Guernsey breed. All these, of course, are initial records. The other classes of Guernseys were not studied.

The register-of-merit rules specified that a Jersey cow carrying a calf for 155 days during the period of her test was entitled to entry in class AA. One feature about the class AA Jersey records which tends to nullify the value of any conclusion drawn therefrom, is the fact that in the past many breeders failed to apply for transfer of animals from class A to class AA after they had fulfilled the calving requirement, and consequently there is a certain proportion of the animals which rightly belong to class AA now listed in the other class.

For this reason, and in order to enhance the value of the class averages by using greater numbers, it was thought best to deal with all Jersey records as a single class. However, classes A and AA were compiled separately, and it was found that even with the moderate demands of the former Jersey rules some influence of gestation is apparent in the records. It is well to remember that the group of class AA cows includes some animals that carried a calf full time during the test, and that they grade down to those which just met the specified 155-day period. It might be assumed that the average time that these class AA cows were pregnant during their test periods would be a somewhere near 200 days.

For purposes of comparison, Table 26 lists the Jersey class A and class AA records in parallel columns.

TABLE 26.—*Initial butterfat records for class A and class AA Jersey cows*

Age	Class A		Class AA		Difference in butterfet	Age	Class A		Class AA		Difference in butterfet
	Records	Production of butterfat	Records	Production of butterfat			Records	Production of butterfat	Records	Production of butterfat	
	No.	*Lbs.*	*No.*	*Lbs.*	*Lbs.*		*No.*	*Lbs.*	*No.*	*Lbs.*	*Lbs.*
Under 2 years	461	344	776	342	2	8 to 8½ years	105	497	162	469	28
2 to 2½ years	1,567	368	2,066	368	0	8½ to 9 years	104	465	128	460	5
2½ to 3 years	669	386	944	387	1	9 to 9½ years	77	485	86	454	31
3 to 3½ years	586	409	812	400	9	9½ to 10 years	67	483	61	467	16
3½ to 4 years	385	427	626	420	7	10 to 10½ years	50	487	64	468	19
4 to 4½ years	350	446	574	437	9	10½ to 11 years	28	459	40	459	0
4½ to 5 years	283	457	422	451	6	11 to 11½ years	26	468	27	440	28
5 to 5½ years	265	465	408	453	12	11½ to 12 years	17	499	22	461	38
5½ to 6 years	219	476	368	465	11	12 to 12½ years	16	452	24	440	12
6 to 6½ years	209	482	300	470	12	12½ to 13 years	13	438	3	427	11
6½ to 7 years	165	478	239	462	16	13 to 13½ years	8	472	10	424	48
7 to 7½ years	168	482	227	458	24	13½ to 14 years	6	495	5	451	44
7½ to 8 years	134	480	176	463	17						

Where the groups contain a considerable number of animals the difference in pounds of butterfat is not large enough to be of much significance, though evidence of the effect of gestation is found in the fact that every group, with the exception of those 2 years old, shows a difference in favor of the class A animals, or those which did not meet the calving requirement of the rules. As before mentioned, there may be some cows in the single-letter class which did carry calves 155 days or more but, through neglect of the owner, were not changed to class AA.

Another significant point brought out by this table is that the tax of pregnancy seems to grow more severe with advancing age. The difference between the two classes for all ages up to 3 years is insignificant, but from that age on there is a marked divergence between the average records for the two classes; and it would appear that, while the young animal carries on the function of reproduction without its affecting materially her productive capacity, the older cows do not stand up so well under this double strain.

RECENT IMPROVEMENT IN PRODUCTION

An interesting fact brought out incidentally by this study is the noticeable improvement in production records since the beginning of 1920, especially in the last thousand records. This is illustrated in Figure 1. All the animals shown are classed according to age; and in each age class an average record is computed for each successive group of 1,000 records in the Register of Merit. These averages are plotted in solid lines, and the dotted lines represent the average record for each age group over the entire period of time. At the top of the graph is shown the year in which each block of 1,000 records was completed.

The chart shows that there has been a general improvement in all classes, most of which appears in the last 6,000 records. The rise is gradual and would seem to indicate that with the increase in experience gained by handling test cows the breeders have developed better methods of feeding, conditioning, and caring for animals on test which have brought about better average records. The effect of years of selective breeding for high production is also a force working to raise these averages.

That some such factors have raised the general average of all records also helps to account for the fact that the reentry records made after a lapse of six years or more usually show a larger increase due to development than those made after a shorter interval. We have here a combination of development of the cows and methods of caring for them.

SUMMARY AND CONCLUSIONS

Initial advanced-registry Guernsey records and register-of-merit Jersey records furnished material for Tables 1 and 2, which show the average production for animals grouped according to age.

A study of these tables shows the actual relationship of average records made at different ages.

The results will be used as a basis for adjusting records of various ages in future studies of prepotency of sires made by this bureau.

The age of maximum production for the Jersey cows included in this study begins when the cow is 6 years old and continues until she reaches the age of 10½ years.

The data on the Guernsey cows studied indicate that they reach their maximum producing ability at 5 years of age, and the period of maximum production continues until they are 11 years old.

The results of this study do not furnish a basis for interbreed comparisons, since it embodies Jersey records with and without calving requirements; whereas the Guernsey records were all of the

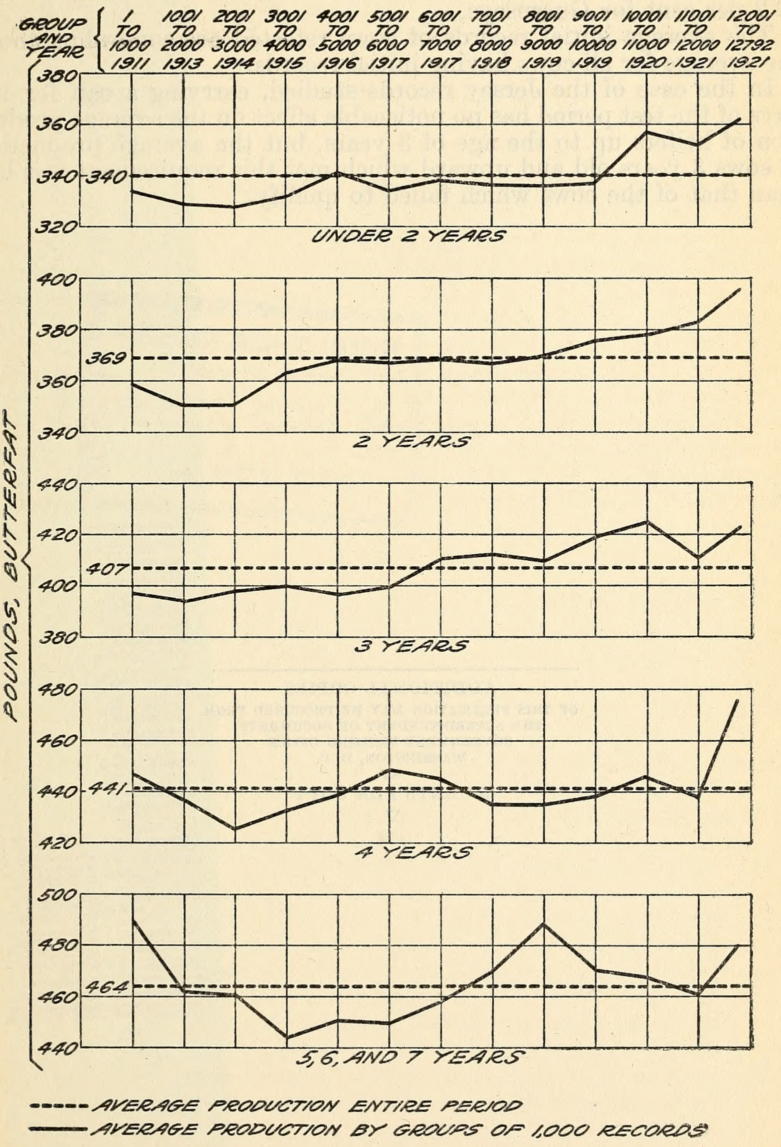

FIG. 1.—Improvement in butterfat production of Jersey cows, as shown by the average production of all records for each class compared with the average production of each thousand records, 1911 to 1921. Dotted line: Average production for entire period. Solid line: Average production by groups of 1,000 records

single-letter class. Furthermore, no information is given to indicate what proportion of the cows were milked more than twice daily.

The increase in production from an initial record to a reentry record is owing partly to increased age and partly to the development which the animal undergoes during the progress of her initial official test. This latter, which has been called the factor of development, averages 11.0 per cent of the reentry record for Jerseys and 12.2 per cent for Guernseys.

The average initial records of cows retested are somewhat above the average for all cows having initial records.

In the case of the Jersey records studied, carrying a calf for 155 days of the test period has no noticeable effect on the average production of heifers up to the age of 3 years, but the average production of cows 3 years old and upward which met this requirement was less than that of the cows which failed to qualify.

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